

No.

200400104



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Rutgers, The State University of New Jersey
& ZSeeds, LLC

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC FURNISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE APPLICANT(S) TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR PROPAGATING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED IN THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BLUEGRASS, KENTUCKY

'Arrow'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this second day of October, in the year two thousand and eight.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

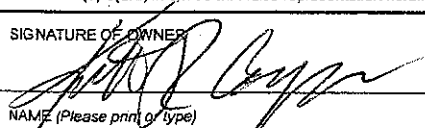
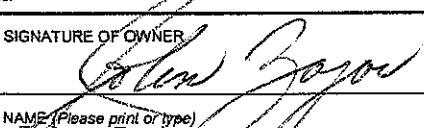


U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Rutgers, The State University of New Jersey & ZSeeds, LLC		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME A97-1567		3. VARIETY NAME Arrow	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Cook College, 88 Lipman Dr. New Brunswick, NJ 08901-8525 P.O. Box 8 Berlin, MD 21811		5. TELEPHONE (include area code) 410-641-3752		FOR OFFICIAL USE ONLY PVPO NUMBER 200400104	
6. FAX (include area code) 410-641-3754		7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Public University & LLC		8. IF INCORPORATED, GIVE STATE OF INCORPORATION Maryland	
9. DATE OF INCORPORATION Jan. 2000		10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) John Zajac, President ZSeeds, LLC P.O. Box 8 Berlin, MD 21811		FILING DATE February 9, 2004	
11. TELEPHONE (include area code) 410-641-3752		12. FAX (include area code) 410-641-3754		FILING AND EXAMINATION FEES: \$ 3652- DATE 2/9/04 CERTIFICATION FEE: \$ 768.00 DATE 8/15/2008	
13. E-MAIL zajacjj@earthlink.net		14. CROP KIND (Common Name) Kentucky bluegrass		15. GENUS AND SPECIES NAME OF CROP Poa pratensis	
16. FAMILY NAME (Botanical) Poaceae		17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee \$3652.00, made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)	
19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act. <input type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input checked="" type="checkbox"/> NO (If "no", go to item 22)		20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED		21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? IF YES, SPECIFY THE <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED NUMBER 1,2,3, etc. 4 4 7 (If additional explanation is necessary, please use the space indicated on the reverse.)	
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)		24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.	
SIGNATURE OF OWNER  NAME (Please print or type) Keith R. Cooper		SIGNATURE OF OWNER  NAME (Please print or type) John Zajac		CAPACITY OR TITLE Acting Exec. Dean of Agriculture & Natural Resource	
DATE 1/07/04		CAPACITY OR TITLE President		DATE 11/1/2003	

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$2,705 (\$320 filing fee and \$2,385 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

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pvpindex.htm

ITEM

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

21. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

First date of sale in USA expected, August 2004.

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

23. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705.

Telephone: (301) 504-8089. <http://www.ams.usda.gov/lsg/seed.htm>

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

S&T-470 (07-01) designed by the Plant Variety Protection Office with WordPerfect 9.0. Replaces STD-470 (04-01) which is obsolete.

Exhibit A
Breeding History
Arrow
Kentucky Bluegrass

Arrow Kentucky bluegrass (*Poa pratensis* L.) appears to have originated from a single, apomictic plant selected from the open-pollinated progeny of *America* Kentucky bluegrass (1).

Plants of *America* were open pollinated by typical plants of *Monopoly* and plants collected from the Mid-Atlantic region, Delaware, Maryland, New Jersey and Pennsylvania. These *America* plants were separated into 16 small open-pollinated crossing blocks and pollinated by approximately ten plants in each block, during the late winter of 1994 in a greenhouse located on the Cook College campus of Rutgers University. Environmental conditions prior to and during pollination were modified to increase sexual reproduction of facultatively apomictic Kentucky bluegrasses (2,3,4). Seed from the *America* female parents were harvested and thinly seeded into several small turf plots in the fall of 1994 at the Rutgers Plant Biology and Pathology Research and Extension Farm, North Brunswick, NJ. In the summer of 1996, single plants were selected from these plots based on their performance under mowed conditions. These individual plants were then clonally propagated and three clones of each plant were established in a spaced plant nursery in the fall of 1996 at the Rutgers Plant Biology and Pathology Research and Extension Farm, Adelphia, NJ. In the summer of 1997, clonal plants of an attractive F₁ hybrid plant designated 96-3071-4 was harvested. This was planted in a turf plot at Adelphia, New Jersey in the fall of 1997 with the designation *Arrow*.

Arrow was a late maturing, average yielding plant compared to other plants in that field. *Arrow* has a medium-low growth habit, above average turf quality and winter color and excellent leaf spot resistance.

References

- Funk, C.R., G.W. Pepin, and M.F. Robinson. 1982. Registration of *America* Kentucky bluegrass. Crop Sci. 22(2):447.
- Bashaw, E.C., and C.R. Funk. 1987. Apomictic grasses. p. 40-82. In F. Lemaire (ed.) Proc. Int. Turfgrass Res. Conf, 5th, Avignon, France. INRA Publ., Versailles.
- Hintzen, J.J., and A.J.P. van Wijk. 1985. Ecotype breeding and hybridization in Kentucky bluegrass (*Poa pratensis* L.). p. 213-219. In F. Lemaire (ed.) Proc. Int. Turfgrass Res. Conf, 5th, Avignon, France. INRA Publ., Versailles.
- Pepin, G.W., and C.R. Funk. 1971. Intraspecific hybridization as a method of breeding Kentucky bluegrass for turf Crop Sci. 11:445-448.

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I propose the following paragraph changes/additions to clarify:

"Plants of America were open pollinated by typical plants of Monopoly and plants collected from old turf areas in the Mid-Atlantic region, Delaware, Maryland, New Jersey and Pennsylvania. These America plants---(etc,continue to)--- designated 96-3071-4 was harvested, based on selection criteria including plant density, growth habit, and disease resistance. This was planted in a turf plot at Adelphia, New Jersey in the fall of 1997, designated A97-1567, later named Arrow."

"Arrow was a late---(etc, continue to)- - -leaf spot resistance."

"Observations from three subsequent multiplication years of Arrow indicate it to be a stable and uniform variety. No significant variant population has been observed."

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Exhibit B
Summary of Variety Distinctness
Arrow
Kentucky Bluegrass

Arrow Kentucky bluegrass is most similar to the existing cultivar *America*. *Arrow* can be differentiated from *America* being taller in mature plant height (Table 1).

Table 1. Mature plant height for Kentucky bluegrass cultivars during single growing seasons at two locations.

Cultivar	2001	2002
	Hubbard, OR †	Albany, OR
Arrow	61.7	49.1
America	57.1	40.1
Julia	66.2	63.6
Baron	60.0	51.8
LSD@0.05	2.7	5.7

† Measurements for trait were taken from replicated spaced planted nurseries of cultivars at field locations near Hubbard, OR and Albany, OR.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this collection of information is (0581-0055). The time required to complete this information collection is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY PROGRAM
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(BLUEGRASS)

OBJECTIVE DESCRIPTION OF VARIETY
BLUEGRASS
(*Poa* spp.)

NAME OF APPLICANT(S) <i>Rutgers, The State University of New Jersey & ZSeeds, LLC</i> (BT: 7/23/08)	TEMPORARY DESIGNATION A97-1567	VARIETY NAME Arrow
ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code) <i>P.O. Box 8</i> <i>Berlin MD 21811</i> <i>Cook College</i> <i>88 Lipman Dr.</i> <i>New Brunswick, NJ 08901-8525</i>		FOR OFFICIAL USE ONLY PVPO NUMBER #200400104

Select the number which characterizes the variety in the features described below. For measured characteristics use leading zeros as necessary in order to fill all blanks (e.g. 089). Those characteristics marked with a star * are preferred to be recorded. Any others should be recorded to help establish novelty or uniqueness. Characteristics described, including numerical measurements, should represent those that are typical for the variety. Measured data should be for SPACED PLANTS. Royal Horticultural Society or any recognized color fan may be used to determine plant colors; designate the system used:

Describe location of test area, conditions, and number of Plants used:

1. SPECIES:

☒ 1 = *Poa compressa* 2 = *P. pratensis* 3 = *P. trivialis* 4 = Others (Please Specify):

☐ ☐ ☐ Chromosome Number

2. ADAPTATION: (0 = Not Tested, 1 = Not Adapted, 2 = Adapted, 3 = Well Adapted)

☒ Northeast ☒ Transitional Zone ☐ Southeast ☒ North Central
☒ Pacific N.W. ☒ Intermountain ☐ Southwest (CA, AZ) ☐ Other (Please Specify):

3. MATURITY (At first anthesis): Give test area

4.

* ☒ 1 = Very Early 2 = Early (Delta, Mystic) 3 = Medium Early (Fylking, Nugget)
4 = Medium late (Newport, Adelphi, Aquila) 5 = Late (Merion, Baron, Enmundi)
6 = Very Late (Pacific)

Date of First Anthesis:

<input type="checkbox"/> <input type="checkbox"/> 7	Number of days earlier than	* <input type="checkbox"/> 10	1 = Nugget	2 = Frylking	3 = Delta
	Maturity same as	* <input type="checkbox"/> 11	4 = Merion	5 = Newport	6 = Baron
<input type="checkbox"/> <input type="checkbox"/> 4	Number of days later than	* <input type="checkbox"/> 1	7 = Mystic	8 = Sabre	9 = Reubens
			10 = Moonshadow	11 = Midnight	

4. **PLANT HEIGHT** (At maturity-Average of longest shoot of 10 plants from soil surface to top of panicle): *Test Area*

★

1 = Short

3 = Medium tall (Merion, Adelphi)

2 = Medium short (Baron, Fylking, Mystic)

4 = Tall (delta)

5 = Very tall

★ cm Height

cm Shorter than

Height same as

cm Taller than

★

★

★

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1 = Nugget

2 = Frylking

3 = Delta

4 = Merion

5 = Newport

6 = Baron

7 = Mystic

8 = Sabre

9 = Reubens

10 = Moonshadow 11 = Midnight 12 = Touchdown

5. **GROWTH HABIT:**

★

Habit: 1 = Prostrate (Nugget)

2 = Semiprostrate (Merion)

3 = Erect (Delta)

cm Amount of spread by rhizomes in 1 year (give test area:)

6. **LEAF BLADE:**

★

Green color:

1 = Light green (Mystic)

3 = Moderately dk. green (Merion, Adelphi)

2 = Medium green (Fylking, Bonnieblue)

4 = Very dk. green (Nugget, Glade, Enmundi)

★

Bluegreen color:

1 = Not bluegreen (Mystic, Touchdown, Parade)

3 = Bluegreen (Nugget, Enmundi, Adelphi)

2 = Moderately bluegreen (Merion, A-34)

4 = Strongly bluegreen (Majestic)

Winter color:

1 = Light green

2 = Dark green

3 = Light purple

4 = Dark purple

5 = Not purple

6 = Not green or purple

★

Hairs upper side:

1 = Absent (Nugget)

2 = Sparse (Merion)

3 = Dense (Park)

Hairs lower side:

1 = Absent (Fylking, Merion)

2 = Sparse

3 = Dense (Nugget)

Luster upper side:

1 = Shiny (Eclipse, Enmundi)

2 = Dull (Aquila, Parade)

Luster lower side:

1 = Shiny (Mystic, Enmundi)

2 = Dull (Barbie, Eclipse)

★

Margin hairs

1 = Absent (Delta)

2 = Present (Fylking, Merion)

(Fringe on Margin or Base):

★

Width:

1 = Very fine (Mystic)

2 = Fine (Nugget)

3 = Medium (Merion, Fylking)

4 = Broad (Adelphi, Baron)

5 = Very broad (Monopoly)

mm Width (flag leaf)

mm Narrower than

Width same as

mm Wider than

★

★

★

1 = Nugget

2 = Frylking

3 = Delta

4 = Merion

5 = Newport

6 = Baron

7 = Mystic

8 = Sabre

9 = Reubens

10 = Moonshadow 11 = Midnight 12 = Touchdown

mm Length (flag leaf)

mm Shorter than

Length same as

mm Longer than

★

★

★

1 = Nugget

2 = Frylking

3 = Delta

4 = Merion

5 = Newport

6 = Baron

7 = Mystic

8 = Sabre

9 = Reubens

10 = Moonshadow 11 = Midnight 12 = Touchdown

2

Position of flag leaf (angle to stem):

1 = Appressed

2 = Open angle, yet stiff

3 = Nodding

7. LEAF SHEATH:

11

mm sheath length

#200400104

★ 1

Seedling Color (base of sheath):

1 = Green (Nugget, Merion)

2 = Red (Delta)

★

Hairs on Margin:

1 = Absent (Fylking)

2 = Present (Nugget)

★

Margin Roughness (to touch):

1 = Smooth (Delta)

2 = Rough (Sabre)

1

Hairs on Surface:

1 = Absent ()

2 = Present (Nugget)

1

Surface Roughness (to touch):

1 = Smooth (Fylking)

2 = Rough (Ram I)

2

Hairs on both sides just beneath leaf blade (under collar):

1 = Absent (Merion)

2 = Present (Nugget)

★

Hairs on ligule:

1 = Absent (Fylking)

2 = Short (Baron)

3 = Long (Nugget)

Glaucosity:

1 = Absent (Mystic, Enmundi)

2 = Present (Birka)

2

Keel:

1 = Absent (Ram I)

2 = Present (Adelphi)

8. PANICLE (Mature Plant):

1 0 0

mm Length (Lowest branch whorl to top,

for 10 plants) Test Area: Albany, OR

0 1 4

mm Shorter than

★ 13

1 = Nugget

2 = Frylking

3 = Delta

Panicle same as

★ 10

4 = Merion

5 = Newport

6 = Baron

0 3 7

mm Longer than

★ 1

10 = Moonshadow 7 = Mystic 8 = Sabre 9 = Reubens
11 = Midnight 12 = Touchdown
13 = Julia

★ 1

Color (at 50% flowering):

1 = Not red (Fylking)

2 = Red (Nugget)

1

Shape of Rachis (opposite lower side branches):

1 = No bend (Nugget)

2 = Bend (Merion)

★ 1

Collar:

1 = Opened (Nugget)

2 = Closed (Merion)

★ 3

Branches Attitude (Lowest whorl): 1 = Drooping (America, Prato)

2 = Horizontal (Merion)

3 = Ascending (Tundra)

4

Number of main branches in lowest whorl:

★ 1

Panicle habit:

1 = Nodding (Newport)

2 = Upright (Nugget)

★ 1

Panicle type:

1 = Open

2 = Intermediate

3 = Compact

4

Anther color (anthesis):

1 = Purple

2 = Yellow

3 = Brown

4 = Greenish-yellow

9. LEMMA

★

Keel

1 = Glabrous

2 = Slightly pubescent

3 = Pubescent

★ 2

Marginal Nerves

50% Glabrous: 45% slightly pubescent; 5% pubescent

2

Intermediate Nerves:

1 = Distinct

2 = Obscure

1

Basal Webbing:

1 = Absent

85% absent; 15% scant

2 = Scant (Baron)

3 = Copious (Merion)

3 Phenol Reaction: 1 = none-lemma removed (Merion) 2 = Beige (Cougar) 3 = Brown (Windsor)
4 = Black (Mystic -2hrs) 5 = Black (-24hrs)

89% seeds stain brown ^{4 = Black (1}

5 7 3 3 Milligrams per 10,000 seed

6	3	4
---	---	---

Milligrams less than

★ ↑ ↑

1 = Nugget 2 = Frylking 3 = Delta

Weight same as

★ 10

4 = Merion 5 = Newport 6 = Baron

3	0	0
---	---	---

Milligrams more than

★ 1

7 = Mystic 8 = Sabre 9 = Reubens

2 Weight Class (g per 10,000 seed): 1 = Light (< 3g Sydspout, Merion)
2 = Medium (3g - 4g Adelphi, Parade)
3 = Heavy (> 4g Fylking, Nugget)

11. ENVIRONMENTAL RESISTANCE:

(0 = Not Tested; 1 = Very Susceptible, 2 = Moderately Susceptible, 3 = Moderately Resistant, 4 = Highly Resistant)

* Cool Temperature (Winter color) Cold (injury) Heat Drought

3 Shade 3 Low Fertility 0 Acid Soil (≤ 5.5) 3 Alkalinity (≥ 7.5)

☐ Salinity ☐ Soil Compaction ☐ Poor Drainage ☐ Air Pollution

☐ Other (Please Specify):

12. DISEASE RESISTANCE:

(0 = Not Tested; 1 = Very Susceptible, 2 = Moderately Susceptible, 3 = Moderately Resistant, 4 = Highly Resistant)

4 Melting-Out *Drechslera poae* (*Helminthosporium vagans*)

3 Helminthosporium Leaf Spot *Bipolaris sorokiniana*


3 Brown Patch *Rhizoctonia solani*

4 Powdery Mildew *Erysiphe graminis*

○ Stripe Smut *Ustilago striiformis*

0	Flag Smut <i>Urocystis agropyri</i>
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0	Pink Snow Mold <i>Fusarium nivale</i>
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Ergot *Claviceps purpurea*

0 Fusarium Blight *Fusarium roseum*, *F. tricinctum*

0	Typhula Blight <i>Typhula</i> spp.
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3 Dollar Spot *Sclerotinia homoeocarpa*

 Sclerotina *S. borealis*

4 Stem Rust *Puccinia graminis*

0 Stripe Rust *P. striiformis*

3 Leaf Rust *P. poae-nemoralis*

0	Orange Stripe Rust <i>P. poarum</i>
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Pythium Blight *Pythium* spp.

Red Thread *Corticium fujiforme*

4 Other (Please Specify): Microdochium
patch

4 Other (Please Specify); Crown rust

13. INSECTS, NEMATODES, RESISTANCE:
(0 = Not Tested; 1 = Very Susceptible, 2 = Moderately Susceptible, 3 = Moderately Resistant, 4 = Highly Resistant)

☐ Chinch Bug *Blissus* spp. (give species:)

☐ Sod Webworm *Crambus* spp. (give species:)

13. INSECTS, NEMATODES, RESISTANCE (*Continued*)

☐ Bluegrass Billbug *Sphenophorus parvulus*

☐ White Grub: Japanese Beetle, Chafers (give species)

☐ Greenbug Aphid *Schizaphis graminum*

☐ Other (Please Specify):

☐ Other (Please Specify):

14. Give variety or varieties that most closely resemble the application variety. For the following characteristics indicate Degree of Resemblance by placing in the column marked D.R., one of the following numbers: 1 = Application variety is less than comparison variety; 2 = Same as; 3 = More than, better, greater, darker, more disease resistant, etc.

CHARACTER	VARIETY	D.R.	CHARACTER	VARIETY	D.R.
Maturity-heading	Midnight	2	Leaf Width	Baron	2
Height	Baron	2	Leaf Color Spring		
Seed Size -length	Baron	2	Leaf Color Summer	Baron	2
Seed Weight	Julia	2	Leaf Color Winter	Julia	2
Cold Injury	Baron	2	Drought	Baron	2
Heat	Kenblue	2	Disease**		
Shade	Kenblue	2	Leafspot	Midnight	2

**Specify each disease evaluated.

15. ADDITIONAL DESCRIPTION

Describe all characteristics and conditions that cannot be adequately described in this form in Exhibit D.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) Rutgers, The State University of New Jersey & ZSeeds, LLC (BT: 7/23/08)		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER A97-1567	3. VARIETY NAME Arrow
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) P.O. Box 8 Berlin, MD 21811 Cook College 88 Lipman Dr. New Brunswick, NJ 08901-8525		5. TELEPHONE (include area code) 410-641-3752	6. FAX (include area code) 410-641-3754
		7. PVPO NUMBER #200400104	

8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain.
ZSeeds, LLC jointly owns the cultivar 'A97-1567' with Rutgers, The State University of New Jersey. ☒ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?
If no, give name of country ☒ YES ☐ NO

10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?
☐ YES ☐ NO If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?
☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (if needed, use reverse for extra space):

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

- If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

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